December 2000
D&D Focus Area
UPDATE
Deactivation & Decommissioning Focus Area
NETL

HIGHLIGHTS

♦ New Technology Deployment Projects Initiated

FY 2001 funding was obligated to five D&D-related projects through OST's ASTD/Pollution Prevention/Technology Deployment program. In brief, these five projects are:

- An Interbuilding Transfer System at RFETS
- Cleanout of the F-Reactor Basin at Hanford
- Application of MARSSIM at NTS
- Characterization/RIFS of the 221-U Facility at Hanford
- Disposition of Contaminated Large Equipment at SRS

Collectively, $3.8 million has been committed to these activities in order to enhance cleanup across the complex. Final technical task plans are being developed based on the work scopes presented in the proposals. DDFA has fully integrated these activities into its portfolio and as such, progress for each will be reported in DDFA's standard communication products, e.g., quarterly reports and factsheets.

For more information on:

Application of MARSSIM at NTS

Characterization/RIFS of the 221-U Facility at Hanford

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An Interbuilding Transfer System at RFETS

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Disposition of Contaminated Large Equipment at SRS

Cleanout of the F-Reactor Basin at Hanford

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LARGE-SCALE DEMONSTRATION AND DEPLOYMENT PROJECTS

♦ LANL LSDDP

As part of the LANL LSDDP, the NT Vision System and Blade Plunging Cutter technologies were demonstrated. The demonstration of these technologies reveals that their use reduces costs, improves worker safety, and expedites work schedules.

NT Vision System was demonstrated during repackaging of materials from two breached fiberglass-reinforced plywood crates into other containers. The NT Vision System provided permanent documentation of the materials placed in the containers. It also revealed that two materials were inadvertently placed in the boxes that pose mixed waste issues. These were retrieved before closing the boxes. As a result of the successful demonstration, LANL plans to deploy the NT Vision System to provide permanent documentation on the contents of its TRU and LLW containers.

A Blade Plunging Cutter from Mega-Tech Services was demonstrated to remove unistrut and 3-inch diameter pipe legs from plutonium gloveboxes. The cutter uses a hydraulically driven, 4-inch blade to sever glovebox legs in a guillotine fashion. Pipe legs are cut in 40 percent less time than the baseline technology, a reciprocating saw. Based on processing two gloveboxes per week for a year, the Blade Plunging Cutter reduced costs by about 5 percent and resulted in reductions in airborne particulate, noise, vibration, and fire and explosion hazards compared to the baseline technology. The International Union of Operating Engineers performed the safety assessment. Based on its higher production rate, cost effectiveness, and enhanced safety features, the Blade Plunging Cutter is expected to be used to remove legs and other appurtenances from surplus contaminated gloveboxes at DOE sites such as LANL, Rocky Flats, and Hanford.

For more information:

http://www-emtd.lanl.gov/LSDDP/DDtech.html

Tech ID 2203

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♦ INEEL Fuel Storage Canals and Associated Facilities LSDDP

Plans for the demonstration of the GLD Technology were advanced to include the demonstration of the Isotopic Identification Device (IID) at the TAN 616, now re-scheduled for mid-January 2001.

For more information:

http://id.inel.gov/lsddp

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ADDITIONAL PROECT HIGHLIGHTS

♦ Modular Manipulator for Robotics Application—ARM Automation, Inc.

The test plan for testing the manipulator at ARM's facility was initiated. This effort included determining the best manipulator configuration to fit in a glovebox. A solid model of a glovebox was obtained from Sandia Notional Laboratory to aid in this effort. The integration of the subcomponents is delayed due to the problems of the controllers and the software. The University of Texas (UT) effort on the tele-operational environment for the manipulator is also just about complete. UT is presently packaging its software to be passed off to ARM for implementation within Cimetrix. The UT effort on the obstacle avoidance implementation is also complete and is being packaged with the tele-operational software. This software development will be delivered to ARM and integrated into Cimetrix once the manipulator is complete. UT's effort on testing the actuator is currently underway. A suitable site for the demonstration of the system is being evaluated.

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♦ Technology for Real Time Measurement of Surface and Airborne Beryllium

A contract has been awarded to Science Engineering and Associates (SEA) to develop a Technology for Real-Time Measurement of Airborne and Surface Beryllium. This field-portable device is based on Laser Induced Breakdown Spectroscopy (LIBS) and will be applicable to continuous air monitoring; field analysis of filters from personal air monitors; and analysis of surface swipe samples. Another potential application is a point-and-shoot device for direct measurement of beryllium on a surface. Accurate and timely detection and monitoring of beryllium is critical to worker safety during deactivation and decommissioning (D&D) activities. Beryllium dust is a significant workplace hazard. Exposure to beryllium particles can cause a serious illness in certain people. This illness is chronic beryllium disease, or CBD—an irreversible and sometimes fatal scarring of the lungs. Beryllium metal has been produced for various industrial uses, and was widely used in aerospace and defense applications. The baseline method for beryllium analysis is sending samples to an off-site laboratory, which takes days or weeks to obtain the results. Demonstration of SEA's instrument is planned for Rocky Flats Environmental Technology Site (RFETS). In addition to RFETS, Oak Ridge (Y-12), LANL, and the DOD have beryllium issues.

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♦ International Agreement with AEA Technology

ARTISAN manipulator—one of many configurations

One proposed D&D task for FY 2001 is the deployment of an ARTISAN manipulator "arm" in a hot cell at the Columbus Environmental Management Project.

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♦ Nuclide Removal Technologies for Treatment of R-Basin Water at SRS ASTD Project

Deployments of the 3M and Selion/Graver technologies continue to achieve "milestones" for cleanup of the disassembly basin water. As of the end of November, approximately 3.6 million gallons of water have been processed for cesium removal. The cesium removal will continue into late-January. The Selion/Graver system will be started in January, targeting strontium for removal. DDFA will continue its efforts of identifying additional deployment sites.

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♦ Florida International University

Creative Concepts, an equipment decontamination and size reduction technology vendor, has been contacted, and a Scope of Work package for Glove Box and Tanks Size was completed. Their technology includes an ultra-high pressure water decontamination system and a mobile, self-contained "car crusher," for on-site equipment decontamination and volume reduction.

The RadTrax/LARADS Radiological Mapping System is a combination of a pneumatically operated survey platform and laser assisted radiological mapping system. The systems showed several desirable characteristics during the demonstration: (1) compared to a traditional Global Positioning Satellite (GPS), LARAD's positional accuracy and the associated detector velocity provides better precision and can be utilized inside buildings where the GPS signals cannot be received; (2) remote operation without the need to erect scaffolding, reducing worker exposure and fatigue; (3) ease of operation; (4) the system is dust-free and generates little noise and secondary waste; and (5) is an effective way to obtain qualitative data, especially in large area surveys, and providing preliminary detection of hot spots.

The primary limitation of this technology is that it may not be used in extremely confined areas.

FIU-HCET has assessed over 80 baseline and innovative technologies for D&D application under standardized, non-nuclear testing conditions.

For more information:

HCET homepage: http://www.hcet.fui.edu

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♦ Canyon Disposition Initiative (CDI)

A concrete coring unit was used to obtain samples to support the structural assessments and to determine whether or not potential contaminants have migrated beyond the confines of the cells. The Remote Concrete Coring System, consisting of a Brokk 150N with concrete coring attachment, was used for obtaining concrete samples in process cells 5, 6, 26, and 36. Remaining samples were shipped for analysis during the reporting period.

Sample analyses of sludge removed from the 24-inch Drain Pipe initially indicate the presence of PCBs. An article on the deployment of the drainpipe characterization robot was published in the November 2000 issue of Mechanical Engineering magazine.

For more information:

http://www.bhi-erccom/canyon/canyon.htm

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♦ Mound Intrusive and Non-Intrusive Characterization Through Concrete Walls and Floors Accelerated Site Technology Deployment (ASTD) Project

The Phase I — Non-Intrusive Characterization Process Summary Report was completed in November 2000. The consensus of the report's Executive Summary follows. The Old Cave at Mound was constructed in the early 1950s and was located in the Semi-Works (SW) Building. It was used to process radium (Ra-226) and actinium (Ac-227) from 1951 to 1955. From 1955 until 1959, decontamination and system component removal from the area were performed, including dismantlement of the cave structure. In early 1959, decontamination and cleanup of the area was completed, although residual contamination was still present. In the early 1960s, the area was refurbished. The contaminated trenches and sumps below the floor were filled with sand and capped with a layer of concrete. An entombment was constructed above the floor to encapsulate the remaining contaminated footer of the old process area. The walls of the room were reinforced with concrete, where necessary, and the room was filled with gravel up to the top of the old footers and capped with concrete. This concrete cap became the floor of what is now SW-19. The Mound exit plan requires that the contaminated entombment be demolished and disposed of at a proper waste disposal site. During Phase I, non-invasive measurements were obtained using the following technologies: (1) ground penetrating radar, (2) electromagnetic ground conductivity, (3) gradient magnetics, and (4) gamma spectroscopy. This characterization was to locate objects or structures buried within the entombment and to define the nature and extent of contamination. The best geophysical information was gathered from the topside of the entombment by electromagnetic surveying. Gamma spectroscopy measurements demonstrated evidence of both Ac-227 and Ra-226 contamination in many areas. Thorium-232 and cesium-137 were also indicated. In addition, uranium-238 and cobalt-60 were identified on the surface in a few specific areas. These measurements indicate that radioactive soil contamination is present beneath the floors in the rooms adjacent to the entombment. Contamination appears to be present within the walls around the entombment, as measured from adjacent rooms. Measurements from directly above the old process area indicate that contamination has migrated into the concrete cap. The gamma spectroscopy survey successfully identified and mapped the locations of subsurface radionuclides in the area, but was unable to quantify activity levels. The current path forward involves conducting a feasibility study to determine if grouting the entombment area is possible, and whether doing so can be accomplished safely. The intent of the grouting is to enhance the design and add safety to the project.

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UPCOMING EVENTS

February 2001

Waste Management 2001

February 25 – March 1, 2001
Tucson, AZ

March 2001

American Nuclear Society (ANS)
9th International Topical Meeting on Robotics and Remote Systems

March 4 – 8, 2001
Seattle, WA

D&D updates and reports (comments and address corrections):

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Quarterly reports, monthly updates, and further information about the D&D Focus Area can be found on the World Wide Web at ***www.netl.doe.gov/dd***.

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